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REMARKS

Entry of this amendment and reconsideration of this application, as amended, are respectfully requested.

Claims 1-7, 9-15 and 17-18 were rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Morrison, Lehan and Hughes. Claims 8 and 16 were rejected under the same statute over the foregoing combination in view of Tsukasa. Applicants respectfully traverse.

Pending claim 1 recites the following features:

1. A sputter arrangement, comprising 1.1 a magnetron and a target,
 - 1.1.1 in which magnetron and target can be moved linearly and relative to one another
 - 1.1.2 and the magnetron comprises a magnet system with at least one inner magnet
 - 1.1.3 and at least one outer magnet surrounding it,
 - 1.1.4 and in which the magnet system forms at least one closed plasma tube between an inner and an outer magnet,
 - 1.1.5 which includes two regions at a distance (C) from one another,
 - 1.1.6 which extend substantially perpendicularly to the direction of movement of the magnetron relative to a substrate
 - 1.1.7 and which have a diameter d wherein with a relative movement between target and magnet system by a path $W \approx C$ the magnet system is laid out such that a width (B) of ends of the plasma tube fulfills the condition $(B) \leq (d)$.

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With the foregoing in mind, Morrison discloses a sputter arrangement (Fig. 5) comprising a magnetron (52') and a target (12), but 1.1.1 ("in which magnetron and target can be moved linearly and relative to one another") is not disclosed, because magnetron and target cannot be moved relative to one another.

Morrison also fails to disclose feature 1.1.2 ("and the magnetron comprises a magnet system with at least one inner magnet"), since item 46' mentioned by the Examiner is a "source" (col. 5, line 64) and not an inner magnet. Item 52' is a fourth magnet (col. 5, line 68 to col. 6, line 1). The other magnets are 48' and 50'. There is no inner magnet as presently claimed. N and S shown in the middle of 12 are arms of U-shaped magnet 48'.

According to the Examiner, the magnet system of Morrison forms at least one closed plasma tube between an inner and outer magnet. However, as pointed out above, Morrison does not disclose an inner magnet. The abstract of Morrison discloses the following at lines 10-14:

"In one embodiment of the invention, a magnetic field dome of a first polarity is disposed over a second magnetic field dome of the opposite polarity".

The first polarity is defined by numeral 46 in Fig. 5, and the second polarity by 48, 50, 52. According to the present invention there are no such two polarities.

Furthermore, as can be understood from the last paragraph of the abstract, the object of Morrison completely differs from the object of the present invention, and, accordingly, item 1.1.4 ("and in which the magnet system forms at least one closed plasma tube between an inner and an outer magnet") is not disclosed by Morrison.

In any event, as is clear from Fig. 1 of the present application, the distance C is not a distance between S poles and N poles. Instead, C is the distance between two long parts 16, 17 of the plasma tube 9.

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As a result, Morrison does not disclose feature 1.1.5 ("which includes two regions at a distance (C) from one another"), either. The same is true with features 1.1.6 and 1.1.7, since there is no movement of the magnet relative to a substrate with Morrison.

The objective of the present invention is to avoid erosion depressions at the margin of the target in a linear sputter installation, whose magnets move relative to the target. Morrison has nothing to do with this objective. As a result, those skilled in the art would never refer to Morrison as a starting point, nor could he arrive at the presently claimed invention as further discussed below.

Lehan fails to disclose item 1.1.6, because the two regions do not extend perpendicularly to the direction of movement of the magnet relative to a substrate. Furthermore, Lehan does not disclose a substrate at all and, therefore, no movement between a magnet and the substrate.

Feature 1.1.7 is also not disclosed by Lehan, since there is no condition like (B) \leq (d).

It is respectfully submitted that the Examiner is incorrect when alleging that it would have been obvious to one ordinary skill in the art to use the plasma racetrack taught in Lehan as the plasma tube in Morrison in order to gain the advantage of reduced erosion of the end portions of target while not reducing the magnetic field. This feature of Lehan cannot be transferred to Morrison apparatus because Lehan describes a cylindrical magnetron (page 6, lines 16-18). The racetracks 36a, 36b (Fig. 3) of Lehan cannot be applied to Morrison, because they would completely disturb the system of Morrison. The arrangement of the magnets in Morrison would not make any sense if the magnet system of Lehan (e.g. Fig. 8) is applied.

According to the present invention the magnetic field is moved with respect to the target, and this movement includes a reduction of speed by braking and a return of motion. In contrast, according to Lehan the movement is always in one direction only. In the present invention, however, the width of the plasma zones in the curves of the plasma is of importance because it has an influence on the erosion of the target. This problem does not occur with Lehan.

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Moreover, as demonstrated above, neither Morrison nor Lehan disclose features 1.1.5, 1.1.6 and 1.1.7. Accordingly, the combination of these references cannot lead to the present invention.

Hughes was cited by the Examiner to show that it is well known to move magnets over a target. However, Hughes does not disclose features 1.1.2 and 1.1.3. As can be clearly seen, the drawings simply show a "magnet assembly 24" which is connected to a ball shaft 34 by a ball nut 36. The magnet assembly 24 consists of an array of magnet elements.

Since Hughes does not disclose inner and outer magnets, a closed plasma tube cannot be formed between the inner and outer magnets. Furthermore, it would not make sense to combine Hughes with Morrison or Lehan, because the principles of Morrison and Lehan would, in essence, be turned upside down, and none of the three teachings would carry out its original functions.

Furthermore, Hughes does not disclose features 1.1.5, 1.1.6 or 1.1.7. Accordingly, since none of the three references discloses these features, no combination of the cited references could lead one to arrive at the presently claimed invention.

Independent claim 2 differs somewhat from claim 1, but features 1 through 1.1.6 the same arguments hold true for claim 2 as they do for claim 1. Thus, the combination of the above-identified three references will not lead to the combination of features 1 through 1.1.6.

Moreover, feature 1.1.7 is not disclosed by any of the references, either.

The Examiner refers to Fig. 2B of Lehan wherein "W_L" is said to correspond to "d" of the present invention and wherein "D_P" is said to correspond to "B"/2 of the present invention. However, a path W being greater than C cannot be found in Lehan. The "path" of the invention concerns the relative movement between target (2) and magnet system (1), i.e. the length of the way of movement. This way of movement does not play any role with Lehan, because Lehan relates to a rotatable target. The present invention concerns linear targets.

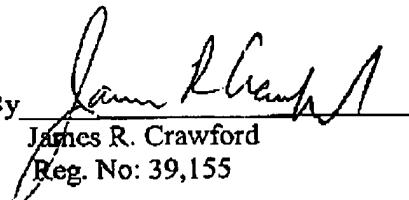
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In view of the foregoing, allowance is respectfully requested.

Any fees due for entry of this amendment, or to otherwise maintain pendency of this application may be charged to deposit account no: 50-0624.

Respectfully submitted

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